RESEARCH REGARDING THE FILTRATION OF POLLUTED AIR FROM AN WORKING ENVIRONMENT USING ULTRASONIC FILTERS

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Abstract: *This paper presents a novel method of filtration and purification of air within an exigent working environment (museums halls, operating theaters, controll rooms etc.) by the use of ultrasonic field. After an analysis of the main disadvantages of classical methods and tehnologies for air filtration and purification, an ultrasonic filter is proposed, designed based on the ultrasonic vibration and cavitation. A schematic drawing is presented together with the computation elements for the design of an ultrasonic system that can be used for such a filter. Experimental results for the purification and filtration of air in an exigent working environment are also presented. The experimental results demonstrate the efficiency of 100% retention of solids and liquids larger than 0.1 μm with an efficiency of 100% and those of smaller dimensions of 0.1 μm with an efficiency of 98.2%*

Keywords: *ultrasonic filtering, air filtering, air purification*

1. Introduction

Society is traversing a period in which environmental issue is, every day, increasingly more important and decisive in the decision promoting or not activities, investments or services as well as improved quality of life.

One of the most important environmental factors is air, with different implications and different environmental factors over all others because it certifies more than ever that we are what we breathe and what we eat.

Increase of life quality of operators in different work environments, especially those the heavily polluted environments (steel mills, foundries, cutting welding, plastic deformation, heat treatment and coatings, paint etc.) and risk reduction disease involves the completion of the filtering and purification of polluted air. Realization of these operations filtration and purification is done using a number of methods and technologies allowing retention of solid and liquid particles with dimensions larger than 2,0μm and specific pollutants each environment [1], [2].

But there are many situations when necessary to retain solid particles smaller than 2.0μm 0.1μm or even lower and the type of pollutant fumes, gases, volatile organic compounds, the fragrance etc. as well operating rooms, halls tanks, museums rooms, control rooms and high precision microcontroller and others[7], [8].

Classical methods and technologies of filtering and purification has some limitations and disadvantages as the most important being [4]:

- Retention of solid particles and liquid incomplete existing work environment and retention unable smaller dimensions particles of 2.0μm, except under conditions than under low efficiency;
- Grade the retention of solid particles and liquids is variable during operation of the filtering device;
- The need periodic cleaning and changing of filter elements and thus less efficient filtration and purification technology;